raised bogs, this report stands as one of the most notable of recent years.—Geo. D. Fuller.

A new fixative for paraffin sections.—Dr. Koloman Szombathy[7] describes a new method of fixing paraffin sections to the slide. The fixative is claimed to have the advantage of not being dissolved by alkaline stains, and furthermore in not being stained by hematins and aniline stains such as eosin fuchsin, orange G., etc. The formula given by him is as follows: gelatin 1 gm., distilled water 100 cc., salicylate of soda (a 2 per cent solution) 1 cc., pure glycerine 15 cc.

Dissolve the gelatin in water at 30°, add the salicylate of soda, shake well, cool, and filter. To this add 15 gm. of pure glycerine. The solution obtained should be perfectly clear. A small amount of the fixative together with a drop or two of a 2 per cent formalin solution is placed on the slide, smeared evenly over the surface, and rubbed in well. Care should be observed that the formalin is mixed with the fixative. The sections or paraffin ribbons are then placed on the fixative and permitted to dry in the thermostat or any other warm place which is protected from dust. The formalin "tans" the gelatin and makes it insoluble. A modification of the method consists in exposing the slides, which have been mounted without the use of formalin solution, to vapors of concentrated formalin in a thermostat. The effect of the formalin is identical. A third method consists in preparing a solution of equal parts of 1 per cent gelatin in water and 2 per cent formalin. The fixative is then used as recommended for albumen fixative.

The writer has tested the fixative recommended by Szombathy and finds it to be an excellent one. Material known to be difficult to retain on the slide was tried out. Sections of grass leaves and moss archegonia adhered to the slide even when the latter were left in running water for several days or exposed to a strong solution of hydrogen peroxide. Alkaline stains do not dissolve the gelatin nor do the stains tested stain the background to an appreciable extent.

Of the 3 methods originally recommended, the following modification gives the most satisfactory results. Make up the fixative according to the first formula, put a drop on the slide, and smear it evenly over the surface. Float the paraffin ribbon on the slide on a 2 per cent formalin solution. Warm the slide gently on the usual copper plate and, after the ribbon has straightened and become smooth, drain off the surplus water and let the preparation dry. When one is dealing with material which does not stick to the slide easily, it will be found of advantage to put a small dish of formalin in the thermostat where the preparations are drying, since the formalin vapors help in rendering the gelatin insoluble.

This new fixative is very easily prepared, keeps well, and does hold the sections to the slide. It should come into general use especially for material which does not adhere to the slide under ordinary conditions and when stains

[7] Szombathy, Koloman, Neue Methode zum Aufkleben von Paraffinschmitten. Zeitschr. Wiss. Mikr. **34**:334–336. 1918.

are employed which are alkaline in nature and have the objection of staining the background.—ERNEST F. ARTSCHWAGER.

Size variation in secondary xylem.—BAILEY and TUPPER[8] have applied the comparative method in thoroughgoing fashion to an attack on the problem of cell size. Confining themselves to a study of the length of the tracheary elements in the secondary xylem of trees and shrubs among vascular cryptogams, gymnosperms, and angiosperms, they present data derived from thousands of measurements on some 440 species belonging to 124 families. The most conspicuous fact brought out by this reconnaissance survey is that the length of these elements is roughly correlated with phylogenetic position, being greatest in vascular cryptogams, somewhat less in gymnosperms, and least in angiosperms. This progressive reduction in the length of the wood cells has been associated with the reduction in amount of the primary xylem in the passage from lower to higher forms, but is probably due in greatest measure to the evolution and differentiation of vessels. These elements have become progressively shorter and broader, thus losing their resemblance to the primitive tracheid; and the fibers and tracheids associated with them have also grown shorter, although naturally to a less extent. Notable exceptions to the general rule are the vessel-less Magnoliaceae and Trochodendraceae, represented by *Drimys* and *Trochodendron*, which possess tracheary elements far longer than other angiosperms, and thus resemble the gymnosperms. Evidence from this source obviously supports the view that these genera are primitive rather than reduced types.

The authors have also made a preliminary study of the relations between the length of the tracheary elements and the age of the plant, its growth habit, and the environment under which it lives. So far as the cells studied are concerned, there is no definite correlation between body size and cell size. The tracheary elements may increase in length for a few years as the plant grows larger, but they soon reach a constant size. Dwarfed and depauperate plants tend to have somewhat smaller elements than normal individuals.

The authors point to the need of more intensive investigations in this hitherto almost unexplored field; and in particular call for a careful study of the activities of the cambium and the factors which direct these activities. Indeed the growing point of plants, once so enthusiastically studied as the key to histology and then for so long neglected, bids fair to be once more a center of interest as one of the keys to a knowledge of morphogenesis.—E. W. SINNOTT.

Sap concentration in epiphytes.—Continuing the studies already noted[9] upon the concentration of tissue fluids, HARRIS[10] has found in several species of

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[8] BAILEY, I. W., and TUPPER, W. W., Size variation in tracheary cells. I. A comparison between the secondary xylems of vascular cryptogams, gymnosperms, and angiosperms. Proc. Amer. Acad. 54:149–204. *figs. 6.* 1918.

[9] BOT. GAZ. 65:285–286. 1918.

[10] HARRIS, J. ARTHUR, On the osmotic concentration of the tissue fluids of desert Loranthaceae. Mem. Torr. Bot. Club 17:307–315. 1918.